

repeating the simulating the bit drilling; and
repeating the adjusting and simulating until a rate of penetration of the bit through the
selected earth formation is maximized.

24

25. (Amended) A method for optimizing a design of a roller cone drill bit, comprising:
simulating the bit drilling through a selected earth formation;
adjusting at least one design parameter of the bit;
repeating the simulating the bit drilling; and
repeating the adjusting and simulating until an axial force on the bit is substantially
balanced between the roller cones.

25

26. (Amended) A method for optimizing a design of a roller cone drill bit, comprising:
simulating the bit drilling through a selected earth formation;
adjusting at least one design parameter of the bit;
repeating the simulating the bit drilling; and
repeating the adjusting and simulating until a volume of formation cut by the bit is
substantially balanced between the roller cones.

26

27. (Amended) A method for optimizing a design of a roller cone drill bit, comprising:
simulating the bit drilling through a selected earth formation;
adjusting at least one design parameter of the bit;
repeating the simulating the bit drilling; and
repeating the adjusting and simulating until an optimized design is determined, wherein
the simulating comprises:
selecting bit design parameters;
selecting drilling parameters;
selecting an earth formation to be represented as drilled;
calculating from the selected parameters and the formation, parameters for a
crater formed when one of a plurality of cutting elements on the bit
contacts the earth formation, the cutting elements having known geometry;